METHOD FOR MANAGING DATA USING IN-MEMORY DATABASE AND APPARATUS THEREOF

[0001] This application claims priority from Korean Patent Application No. 10-2015-0146033 filed on Oct. 20, 2015 in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND OF THE PRESENT INVENTION

[0002] 1. Field of the Present Invention

[0003] The present invention relates to a method for managing data using an in-memory database. More particularly, the present invention relates to a method for managing data through an adjustment of a replication factor of data on the in-memory database, and an apparatus thereof.

[0004] 2. Description of the Related Art

[0005] When the database is installed on a disk, a table and an index exist on the disk. Therefore, when a search of a particular material is requested, the specific material first goes through a process of being provided from the database to the memory.

[0006] Such a database has a problem in which a response speed of the database installed on the disk falls with an increase in an amount of data. As an overcoming solution to this problem, a use of an in-memory database in which the database is installed on the main memory may be suggested. In the case of the in-memory database, since the database is installed in the main memory, the requested data does not need to go through a process of being provided from the database to the memory. That is, since the in-memory database may directly search the requested data on the memory, it provides a quick access to the requested data.

[0007] However, in the in-memory database, extension of a storage space is not easy as compared to the existing database installed on the disk. Further, the in-memory database requires a higher cost than the existing database installed on the disk, in the construction of the database. Therefore, there is a need for a method capable of effectively using a limited storage space of the main memory. However, a method capable of effectively managing the data in the in-memory database has not been suggested.

SUMMARY OF THE PRESENT INVENTION

[0008] An aspect of the present invention provides a method for managing data and an apparatus thereof that allow an access to a required data, even when deleting some data stored in the in-memory database.

[0009] Specifically, an aspect of the present invention provides a method and an apparatus capable of securing a storage space on the main memory, by adjusting the replication factor of the data stored in the in-memory database.

[0010] Another aspect of the present invention provides a method and an apparatus capable of preventing a state of memory-full, by measuring an amount of use of the storage space of the in-memory database.

[0011] Still another aspect of the present invention provides a method and an apparatus capable of ensuring the storage space on the main memory, by deleting only some data of the data distributed and stored on a plurality of nodes.

[0012] The aspects of the present invention are not limited to those mentioned above, and other aspects that have not been mentioned will become more apparent to one of ordinary skill in the art to which the present invention pertains by referencing the detailed description of the present invention given below.

[0013] According to the present invention, there is an effect capable of automatically securing a storage space, by adjusting the replication factor of the data before the state of memory-full occurs.

[0014] Further, according to the present invention, there is an effect of capable of preventing a memory leak due to the state of the memory-full.

[0015] Further, according to the present invention, there is an effect of providing an administrator with opportunities for backup of the material or expansion of the storage space, by reporting the administrator of the in-memory database that the memory is used more than a threshold value.

[0016] Further, according to the present invention, there is an effect capable of effectively ensuring the storage space without adjusting the replication factor, by deleting only some data distributed and stored on the plurality of nodes.

[0017] In some embodiments, a method for managing data using an in-memory database that is executed by a database management apparatus, the method comprises, determining whether a memory utilization rate is equal to or greater than a threshold value, reducing the value of replication factor of data stored in the memory, when the memory utilization rate is equal to or greater than the threshold value as a result of the determination, and deleting at least one data duplicated with the data, in accordance with the reducing the value of replication factor.

[0018] In some embodiments, a database management apparatus using an in-memory database, the apparatus comprises, a memory configured to store data, and a control unit that determines whether a memory utilization rate is equal to or greater than a threshold value, performs control so that a value of replication factor of the data stored in the memory decreases when the memory utilization rate is equal to or greater than the threshold value as a result of determination, and deletes at least one data duplicated with the data with the decrease in the value of replication factor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The above and other aspects and features of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings, in which:

[0020] FIG. **1** is a conceptual diagram of an in-memory database system according to an embodiment of the present invention;

[0021] FIG. **2** is a block diagram of a data management apparatus using an in-memory database according to another embodiment of the present invention;

[0022] FIG. **3** is a flow chart of a method for managing data using the in-memory database according to still another embodiment of the present invention;

[0023] FIG. **4** is a flow chart of a method for managing data using the in-memory database according to still another embodiment of the present invention;

[0024] FIG. **5** is an exemplary diagram of a method for managing the data referred in some embodiments of the present invention;

[0025] FIG. **6** is an exemplary diagram for explaining the adjustment result of the replication factor referred in some embodiments of the present invention;